

Serial No. 09/910,497
Reply to Office Action of August 2, 2006

Docket No.: 290397.0007
(97541.00007)

Remarks

Applicants had previously filed a Supplemental Response to Office Action on March 17, 2006, which amended the claims as a result of an interview conducted on February 14, 2006. It appears from the Office Action that the examiner did not consider the amendments to the claims submitted in the March 17, 2006 Supplemental Response and examined the claims previously filed. Therefore, in this response, applicants have resubmitted the amendments previously set forth in the March 17, 2006 Supplemental Response and addressed the rejections set forth in the August 2, 2006 Office Action.

Claims 5 and 14-26 were previously cancelled. Claims 30-39 were previously withdrawn. In this response, claims 4, 28-29 and 43 are cancelled. Accordingly, claims 1-3, 6-13, 27, 40-42 and 44-50 are currently pending.

Applicants thank the Examiner for the courtesy extended in the interview held on February 14, 2006.

In the August 2, 2006 Office Action, claims 1-4, 6-13, 27-29 and 40-50 were rejected under 35 U.S.C. § 112 as failing to comply with the written description requirement. Claims 1-4, 6-13, 27-29 and 40-50 were also rejected under 35 U.S.C. § 103 as being obvious in view of Evans, WO 96/37570.

Claim 1 has been amended to recite in the preamble that the heat transfer fluid of the present invention can be used as an engine coolant in environmental conditions ranging from ambient temperatures of -35° F to +130° F. This amendment is supported in the specification at Paragraph 0029 of the published application, which specifically states that the non-aqueous heat transfer fluids of the invention can be used in this ambient temperature range.

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Claims 1, 27 and 40 have been amended to specifically recite that propylene glycol is the diol used in combination with ethylene glycol in the non-aqueous heat transfer fluid of the present invention. This amendment is supported throughout the specification, including, for example, in paragraph 0049 which states that propylene glycol and ethylene glycol are used in one embodiment of the invention. Dependent claims 3 and 42 have been amended to clarify these claims in view of the amendments to the independent claims described above.

Claims 1 and 27 were previously amended to recite that ethylene glycol comprises between greater than 60 percent to about 70 percent ethylene glycol relative to the total weight of diols in the heat transfer fluid. This amendment is supported at paragraph 0028 and paragraph 0049, which states that “[t]he non-aqueous heat transfer fluid may contain [ethylene glycol] in any amount ranging between 0 percent by weight to about 70 percent by weight of the total weight of [ethylene glycol] and [propylene glycol] in the fluid.” The amendment is further supported at paragraph 0068, which describes testing using a formulation in which “the fraction of [propylene glycol] in the mixture as compared to the total of the diols was 30 percent and the fraction of [ethylene glycol] was 70 percent.” As discussed in detail below, this amendment meets the requirements of 35 U.S.C. §112, paragraph one.

As recited in claims 1-3, 6-13, 27, 40-42 and 44-50 as amended, the present application is directed to a non-aqueous heat transfer fluid having reduced toxicity and methods for reducing the toxicity of ethylene glycol based heat transfer fluids. As set forth in claim 1 as amended, the heat transfer fluid comprises between greater than 60 percent by weight and about 70 percent by weight (of the total weight of ethylene glycol and propylene

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glycol in the fluid) ethylene glycol, propylene glycol, and at least one corrosion inhibitor additive that is soluble in ethylene glycol and the additional diol.

As recited in claims 27, 40-42 and 44-50 as amended, the present application is also directed to methods for reducing the toxicity of existing ethylene glycol based fluids by adding propylene glycol, which reduces the toxicity of the ethylene glycol based fluid. As recited in claim 27 as amended, after addition of the propylene glycol, the resulting heat transfer fluid contains a concentration of ethylene glycol by weight that is between greater than 60 percent and about 70 percent of the total weight of the propylene glycol and the ethylene glycol in the fluid.

As explained in applicants' March 17, 2006 Supplemental Response, the previous amendments to claims 1 and 27 reciting that the heat transfer fluid contains between greater 60 percent by weight to about 70 percent by weight ethylene glycol meets the requirements of 35 U.S.C. § 112, paragraph one. The claimed invention relates to reduced toxicity, non-aqueous heat transfer fluids containing ethylene glycol and a second diol, in particular propylene glycol. The specification states that the non-aqueous heat transfer fluid can contain ethylene glycol "in any amount between 0 percent by weight up to about 70 percent by weight of the total weight of the [ethylene glycol] and [propylene glycol] in the fluid." Paragraph 0049 (emphasis added). The specification also states that "[propylene glycol] acts as an antidote for [ethylene glycol] poisoning, thereby rendering mixtures of [propylene glycol] and [ethylene glycol] non-toxic even up to ethylene glycol proportions of 70 percent by weight." Paragraph 0028 (emphasis added). Accordingly, the specification clearly conveys to those skilled in the art that the invention contemplates heat transfer fluids containing any amount of ethylene glycol up to about 70 percent by weight of the total weight of the diols in the fluid.

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In a preferred embodiment described in the specification, the heat transfer fluid is comprised of about 70 percent by weight ethylene glycol and about 30 percent by weight ethylene glycol. Paragraphs 0049 and 0068.

“The function of the description requirement is to ensure that the inventor had possession, as of the filing date of the application relied on, the specific subject matter later claimed by him; how the specification accomplishes this is not material.” In re Wertheim, 541 F.2d 257, 262 (C.C.P.A. 1976). “The written description requirement does not require identical descriptions of claimed compounds, but it requires enough disclosure in the patent to show one of skill in the art that the inventor ‘invented what is claimed’.” Union Oil Co. of California v. Atlantic Richfield Co., 208 F.3d 989, 1001 (Fed. Cir. 2000). The disclosure in the specification cited above, as well as other discussions of the claimed heat transfer fluid in the specification, is clearly sufficient to show one of skill in the art that the applicants had contemplated heat transfer fluids containing any amount of ethylene glycol up to about 70 percent by weight.

In In re Wertheim, the Court of Customs and Patent Appeals reversed the rejection of claims that had been amended from a broader range of 25% to 60% by weight to “between 35% and 60% by weight.” The claims were rejected during examination for not containing literal support in the specification. The court held that this was not enough to support the rejections. The court stated:

If lack of literal support alone were enough to support a rejection under § 112, then the statement of *In re Lukach*, 442 F.2d at 969 . . . that “the invention claimed does not have to be described *in ipsius verbis* in order to satisfy the description requirement of § 112,” is empty verbiage.

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541 F.2d at 265. The court noted that applicants frequently amend their applications to claim less than what is described in an application, but all that is required is that specification reasonably describe what is claimed. Id. at 263. "The burden of showing that the claimed invention is not described in the specification rests on the PTO in the first instance, and it is up to the PTO to give reasons why a description not *in ipsis verbis* is insufficient." Id. at 265.

The present application specifically describes the non-aqueous heat transfer fluid as containing any amount of ethylene glycol between 0 percent by weight and 70 percent by weight, and states that the reduced toxicity of the fluid containing ethylene glycol and propylene glycol is observed at ethylene glycol concentrations of "up to" 70 percent by weight. These disclosures alone are sufficient to meet the written description requirement.

As described in the specification and set forth in the amended claims, the heat transfer fluid recited in the amended claims is non-aqueous, meaning that water is not added or intended to be added to the fluid. Any water that is present is an impurity and would be present in very small amounts. Any such water would typically be removed from the fluid in use when the fluid is heated, as in an engine, because the water would be converted to vapor and vented from the system. Because water may only be present in very small amounts as an impurity, any water present in the fluid is insufficient to cause corrosion, and there is no need to include additives to prevent water-caused corrosion of internal surfaces, i.e. no inhibitors requiring water to remain in solution are necessary.

As set forth in the specification at, for example, paragraph 0027, the only additives present in the heat transfer fluid of the present invention are completely soluble in the ethylene glycol and propylene glycol without the presence or addition of any water. These additives remain dissolved in the fluid regardless of storage or use. As described in the

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specification at paragraphs 0016 to 0021, prior art glycol based heat transfer concentrates required from 3% to 5% by weight water to dissolve additives that need water for solubility, such as metasilicate corrosion inhibitors and buffers. Even with 3% to 5% water, the water-requiring additives would often precipitate out of solution during storage of the concentrate, and if enough additional water were not added to the concentrate to form the heat transfer fluid, the water-requiring additives would precipitate or gel during use at elevated temperatures.

Rejection Under 35 U.S.C. § 112

In the August 2, 2006 Office Action ("the Office Action"), the Examiner rejected claims 1-3, 6-13, 27-29 and 40-50 for failing to comply with the written description requirement. The Examiner stated that the amendment to the preamble stating that the fluid has "a freezing point at atmospheric pressure of less than minus 10°C and a boiling point at atmospheric pressure of greater than 150°C" is not supported in the specification. The preamble to claim 1 has been amended to recite that the heat transfer fluid can be used as an engine coolant in environmental conditions ranging from ambient temperatures of -35° F to +130° F. This amendment is supported in the specification at Paragraph 0029 of the published application, which specifically states that the non-aqueous heat transfer fluids of the invention can be used in this temperature range. Accordingly, the rejection under 35 U.S.C. § 112 is moot.

Rejection Under 35 U.S.C. §103

The Examiner has rejected claims 1-4, 6-12, 27-29 and 40-50 under 35 U.S.C. §103(a) as being obvious in view of Evans, WO 96/37570. Evans describes a non-aqueous heat transfer fluid which preferably comprises propylene glycol as the only glycol present in

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the fluid. WO 96/37570 at page 16, lines 5-7. Although Evans states that the fluid may contain ethylene glycol in addition to propylene glycol, Evans also states that the fluid must contain at least 40% by weight propylene glycol to maintain the heat transfer fluid's required physical characteristics and to avoid increased toxicity. WO 96/37570 at page 16, lines 7-14. All of the heat transfer fluids described and claimed in WO 96/37570 contain at least 40% by weight propylene glycol. The heat transfer fluids described in WO 96/37570 that contain ethylene glycol all contain less than 60% by weight ethylene glycol.

The statement in Evans that a fluid containing EG in combination with PG would result in increased toxicity was consistent with the understanding of those skilled in the art at the time. As described in paragraphs 0060 to 0066 of the present application, addition of a more toxic substance to a less toxic substance was generally understood to increase the toxicity of the resulting mixture. Because EG has a much higher toxicity than PG, it was expected, as stated by Evans, that addition of EG to PG would increase the toxicity of the fluid as compared to pure PG. WO96/37570 at page 16, lines 7-14. Accordingly, Evans teaches that addition of *any* EG to PG is not preferred, and that if EG is added, it must comprise no more than 60% by weight of the heat transfer fluid.

The present inventors unexpectedly discovered that heat transfer fluids comprising PG with levels of EG greater than 60% by weight were no more toxic than PG alone. As described in the specification at paragraphs 0068 and 0069, range tests showed that an LD₅₀ for oral toxicity in rats could not be established for a mixture of 70% EG and 30% PG because there was insufficient mortality, even at dosages that completely filled the rats' stomachs. Moreover, testing also demonstrated that the physical characteristics of the heat transfer fluid at up to 70% EG were adequate for the fluid to function as a heat transfer fluid.

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In order for a reference to render an invention obvious, there must be some motivation or teaching to modify or combine the cited references to arrive at the claimed invention.

MPEP § 2143.01(I). *See also In re Dembicziak*, 175 F.3d 994, 999 (Fed. Cir. 1999) (“Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obvious analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.”). In addition, the prior art reference must be considered as a whole, including portions that teach away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983); MPEP § 2141.02(VI).

In this case, there is nothing in Evans which suggests or teaches the desirability of modifying the heat transfer fluid described in Evans to contain more than 60% EG as recited in the claims as amended. To the contrary, Evans explicitly teaches away from fluids having greater than 60% by weight EG due to the expected toxicity of the fluid. Accordingly, one skilled in the art would not have been motivated by anything in Evans to increase the amount of EG in the fluid to greater than 60% by weight as recited in the amended claims. For at least this reason, the rejection of the amended claims under 35 U.S.C. §103(a) is improper, and applicants respectfully request that the rejection be withdrawn.

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes after considering these remarks, that the application is not in condition for allowance, and in particular if a terminal disclaimer is required for allowance, the Examiner is requested to call the Applicant’s attorney at the telephone number listed below.

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Because the reasons above are sufficient to traverse the rejection, Applicants have not explored, nor do they now present, other possible reasons for traversing such rejections. Nonetheless, Applicants expressly reserve the right to do so, if appropriate, in response to any future Office Action.

No fee is believed to be required. However, if a fee is required or otherwise necessary to cover any deficiency in fees previously paid, authorization is hereby given to charge our Deposit Account No. 50-3569.

Respectfully submitted,

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By: E. E. Grondahl
Eric E. Grondahl
Registration No. 46,741
Attorney for Applicant

PTO Correspondence Address:

McCarter & English, LLP
CityPlace I
185 Asylum Street
Hartford, CT 06103
Phone: (860) 275-6704
Fax: (860) 724-3397

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